

STATE OF VERMONT  
PUBLIC SERVICE BOARD

Docket No. \_\_\_\_\_

Petition of twenty Vermont utilities and )  
Vermont Public Power Supply Authority )  
requesting authorization pursuant to 30 )  
V.S.A. § 248 for the purchase of shares of )  
218 MW to 225 MW of electricity from H.Q. )  
Energy Services (U.S.) Inc. commencing )  
November 1, 2012 through 2038, issuance of )  
findings that such purchases are entitled to )  
rate recovery assurance, and requesting )  
certain approvals under 30 V.S.A. § 108 )

**PREFILED TESTIMONY OF  
PATRICIA H. RICHARDS  
ON BEHALF OF**

**WASHINGTON ELECTRIC COOPERATIVE**

August 17, 2010

Patricia H. Richards' prefiled testimony (i) explains why the H.Q. Energy Services (US) Inc. Power Purchase Agreement ("HQUS PPA"), the WEC-VPPSA HQUS PPA Sub-allocation Agreement, and WEC-VEC Sleeve Agreement are needed to meet Washington Electric Cooperatives energy requirements (Section 248(b)(2)(need)), (ii) how the agreements provide an economic benefit to WEC, its members and the state (Sections 248(b)(4)(economic benefit)), and is consistent with the WEC IRP (Section 248(b)(6)(IRP)).

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### **Exhibits**

- Exhibit WEC 1 (PR-1): Patricia H. Richards Resume**
- Exhibit WEC 2 (PR-2): WEC Resource Mix vs Load with Vermont Wind**
- Exhibit WEC 3 (PR-3): WEC Resource Mix vs Load without Vermont Wind**
- Exhibit WEC 4 (PR-4): WEC-VEC Sleeve**
- Exhibit WEC 5 (PR-5): WEC Average Annual Load Shape**
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- Exhibit WEC 7 (PR-7): Natural Gas Curves**
- Exhibit WEC 8 (PR-8): Inflation**
- Exhibit WEC 9 (PR-9): Summary of HQ Analysis Cases**
- Exhibit WEC 10 (PR-10): Excerpts from WEC's IRPs**
- Exhibit WEC 11 (PR-11): Market Price Assumptions**

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1           **1.     Introduction**

2    Q1.    Please state your name, occupation and business address.

3    A1.    My name is Patricia H. Richards and I am a Senior Consultant for La Capra Associates.

4           My business address is 277 Blair Park, Suite 210, Williston, Vermont. The main office  
5           for La Capra Associates is One Washington Mall, 9<sup>th</sup> Floor, Boston, Massachusetts.

6

7    Q2 .    Please describe your firm.

1 A2. La Capra Associates is a consulting firm specializing in energy planning and market  
2 analysis, energy procurement and portfolio management, regulatory and ratemaking  
3 economics, and regulatory policy in the electricity, natural gas and water utility  
4 industries. For over twenty-five years, our firm has served a broad range of organizations  
5 involved with energy markets -- public and private utilities, energy producers and traders,  
6 financial institutions and investors, consumers, regulatory agencies, and public policy and  
7 research organizations. Much of this work has been done in the New England  
8 marketplace and in Vermont.

9  
10 Q3. Please summarize your education, training and professional experience.

11 A3. I am an energy planner and power supply specialist with over 20 years of experience in  
12 the electric utility industry. My areas of experience include power supply procurement  
13 and management, wholesale and retail power transactions, power project financial  
14 analysis and due diligence, asset valuations, integrated resource planning and analysis,  
15 and electric utility cost of service and rates. My principal client base has focused on  
16 public power systems and wholesale and retail power customers. I have advised  
17 managers concerning the electric power supplies of several Vermont and New England  
18 consumer owned electric utilities. I have also advised large industrial customers, and  
19 power plant developers and owners regarding specific power projects and transactions,  
20 portfolio risk management strategies and power market eligibility. I have prepared and  
21 reviewed numerous valuation analyses of power projects and assets, managed power

1 portfolios of assets and contracts and worked with utilities in managing resources. I have  
2 evaluated the economics, contract structure, credit security, development prospects of  
3 renewable and non-renewable power plants in the northeast U.S. I have prepared, or  
4 have overseen the preparation of all or portions of integrated resource plans for several  
5 Vermont utilities. In addition, my experience includes the preparation of numerous  
6 electric utility rate cases in Vermont. I have provided testimony in numerous Vermont  
7 utility proceedings including, but not limited to, PSB docket 6270 (Amendment of VEPPI  
8 Contracts), PSB docket 7422 VPPSA financing of McNeil NOx reduction project). In  
9 addition I have prepared and been responsible for numerous rate filings and IRPs for  
10 various Vermont municipal entities. My qualifications are set forth in my resume,  
11 Exhibit WEC 1 (PR-1).

12  
13 Q4. What is the purpose of your testimony?

14 A4. My testimony supports Washington Electric Cooperative's (WEC's) decision to  
15 participate as a Buyer through the Vermont Public Power Supply Authority ("VPPSA")  
16 for purchase of power under the Power Purchase and Sales Agreement ("HQUS PPA")  
17 from H.Q. Energy Services (U.S.) ("HQUS"). VPPSA has reached an agreement with  
18 HQUS along with Central Vermont Public Service Corporation, Green Mountain Power  
19 Corporation, Vermont Electric Cooperative, Inc., and other Vermont Distribution

20

1 Utilities (collectively the “Vermont DUs”) whereby the Vermont DUs will each receive  
2 an agreed upon portion of energy and environmental attributes pursuant to the HQUS  
3 PPA. The terms of the HQUS PPA are described in the joint prefiled testimony of  
4 William Deehan and Christopher Cole. WEC has elected to take an allocation of HQUS  
5 PPA power through a sub-allocation agreement with the Vermont Public Power Supply  
6 Authority (“WEC -VPPSA HQUS PPA Sub-allocation Agreement”) and VPPSA has  
7 agreed to accept WEC’s allocation with the intention of sub-allocating WEC’s share of  
8 power to it or its assignee. Finally, WEC and VEC have reached an agreement (“WEC-  
9 VEC Sleeve”) to convey WEC’s portion of the WEC -VPPSA HQUS PPA Sub-  
10 allocation Agreement to VEC until a time that WEC needs it in the future.

11  
12 Specifically, my testimony addresses why power from the WEC-VPPSA HQUS PPA and  
13 the WEC-VEC Sleeve is needed to meet WEC’s power supply requirements (Section  
14 248(b)(2)(need)), how it provides an economic benefit to WEC and its customers  
15 (Sections 248(b)(4)(economic benefit)), and explains how it is consistent with the  
16 WEC’s IRP (Section 248(b)(6)(IRP)). As such, my testimony complements and  
17 supplements the prefiled testimony from VPPSA, the “statewide” joint Deehan/Cole  
18 prefiled testimony that is offered on behalf of all Petitioners, and VEC.

1           **2.     WEC's HQUS PPA Power Purchase Entitlements**

2   Q5.    Please describe WEC's power purchase entitlements under the WEC -VPPSA HQUS  
3           PPA Sub-allocation Agreement.

4   A5.    As described in the Joint Deehan/Cole prefiled testimony, The HQUS PPA includes six  
5           periods for the Energy Quantity, with two allocation tables. At the outset, the Energy  
6           Quantity is subject to the transfer capability limitations at Highgate, which is currently  
7           218 MW, and therefore 218 MW is the Energy Quantity to be allocated among the  
8           Vermont Buyers. If Highgate's transfer capability is increased to 225 MW during the  
9           term of the PPA, the Energy Quantity will increase to 225 MW and the allocations among  
10          the Vermont Buyers will increase. The following two tables are from the HQUS PPA  
11          and identify the Vermont Buyers' allocations and WEC's portion is noted below each  
12          table:

13  
14  
15  
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17  
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21

1 **BUYERS' SHARES OF THE ENERGY QUANTITY AT 218 MW**

	November 1, 2012 to October 31, 2015	November 1, 2015 to October 31, 2016	November 1, 2016 to October 31, 2020	November 1, 2020 to October 31, 2030	November 1, 2030 to October 31, 2035	November 1, 2035 to October 31, 2038
	MW	MW	MW	MW	MW	MW
<b>BED</b>	0	5	5	9	9	4
<b>CVPS</b>	0	83.119	94.119	95.119	105.809	22.69
<b>GMP</b>	4.821	65.589	75.063	75.063	79.11	18.342
<b>Stowe</b>	1.032	2.884	2.984	2.984	2.251	0.399
<b>VEC</b>	15.236	15.236	15.236	16.236	4.004	4.004
<b>VPPSA</b>	0.911	11.172	15.598	15.598	16.267	6.006
<b>Vermont Marble</b>	3	4	4	4	1.559	0.559
<b>Total</b>	25	187	212	218	218	56

2

3 WEC will be allocated Energy Products from the HQUS PPA through VPPSA in the

4 amount of 2.40 MW from November 1, 2016 through October 31, 2030 and 2.653 MW

5 from November 1, 2030 through October 31, 2038 under the 218 MW Highgate

6 scenario.

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**BUYERS' SHARES OF THE ENERGY QUANTITY AT 225 MW**

	November 1, 2012 to October 31, 2015	November 1, 2015 to October 31, 2016	November 1, 2016 to October 31, 2020	November 1, 2020 to October 31, 2030	November 1, 2030 to October 31, 2035	November 1, 2035 to October 31, 2038
	MW	MW	MW	MW	MW	MW
<b>BED</b>	0	5	5	9	9	4
<b>CVPS</b>	0	85.419	96.419	98.419	112.101	26.682
<b>GMP</b>	7.017	67.485	76.959	76.959	81.293	20.825
<b>Stowe</b>	1.238	2.89	2.99	2.99	2.135	0.483
<b>VEC</b>	17	17	17	17	3.845	3.845
<b>VPPSA</b>	1.745	11.206	15.632	15.632	15.91	6.449
<b>Vermont Marble</b>	5	5	5	5	0.716	0.716
<b>Total</b>	32	194	219	225	225	63

WEC will be allocated Energy Products from the HQUS PPA through VPPSA in the amount of 2.40 MW from November 1, 2016 through October 31, 2030 and 2.724 MW from November 1, 2030 through October 31, 2038 (under the 225 MW Highgate scenario).

Q6. Can WEC obtain additional power through the WEC -VPPSA HQUS PPA Sub-allocation Agreement if some VPPSA members elect not to participate in the WEC -VPPSA HQUS PPA Sub-allocation Agreement?

A6. Yes. WEC has an option to obtain additional power through the WEC -VPPSA HQUS PPA Sub-allocation Agreement if VPPSA members do not participate. WEC has agreed to take an additional amount of power up to 4.0 MW through its agreement with VPPSA in the event of such a contingency.

1  
2 Q7. Please describe WEC's current HQ VJO contract quantities and scheduling requirements  
3 for delivery of energy as compared to the quantities of energy WEC will be eligible to  
4 purchase under the WEC -VPPSA HQUS PPA Sub-allocation Agreement.

5 A7. Under the existing Hydro Quebec Vermont Joint Owner (HQVJO) contract, WEC elected  
6 to receive 2.589 MW of firm power from HQ under Schedule B. This block of HQ power  
7 currently supplies 22% of WEC's purchase power needs. Schedule B began in late 1995  
8 and continues through October 2015. HQ and the VJO have exercised all call options  
9 likely to be exercised under the current contract, and therefore energy will be provided  
10 for the remainder of the contract term at an annual average capacity factor of 75%. The  
11 deliveries of energy in the current VJO contract can be shaped to increase during on-peak  
12 and seasonal periods to maximize the contracts economic benefits. WEC receives the  
13 bulk of its Schedule B power through the Highgate Converter and related transmission  
14 facilities.

15  
16 Under the WEC -VPPSA HQUS PPA Sub-allocation Agreement, WEC will initially  
17 receive 2.4 MW or slightly less than its current VJO contract allocation. However,  
18 beginning in November 1, 2030 WEC may receive an additional .253 MW or .324 MW,  
19 depending upon an anticipated increase in the Highgate capacity rating of 218 MW or  
20 225 MW respectively. In the event some of the VPPSA systems choose not to  
21 participate, then WEC could get an additional allocation of power through the WEC -

1 VPPSA HQUS PPA Sub-allocation Agreement but WEC's allocation is capped at 4.0  
2 MW. Energy will be delivered 7 days a week from hour ending 08:00 to hour ending  
3 23:00. This energy profile is similar to the current HQ VJO schedule. An added benefit  
4 of the new contract structure is that it does not require advanced scheduling to create  
5 daily, monthly or annual schedules. Hence, the administrative burden in the WEC -  
6 VPPSA HQUS PPA Sub-allocation Agreement is significantly lessened which is a  
7 residual benefit to implementing the new contract.  
8

9 **3. Section 248(b)(2) – Need**

10 Q8. Section 248(b)(2) requires the Board to find that this PPA is required to meet the need for  
11 future demand for service which could not otherwise be provided in a more cost effective  
12 manner through energy conservation programs and measures and energy efficiency and  
13 load management measures. Please explain how the WEC -VPPSA HQUS PPA Sub-  
14 allocation Agreement satisfies this criterion.

15 A8. With the expiration of the existing Hydro-Quebec Firm Power Agreement (the "HQ  
16 Contract"), WEC's projected base case load compared to existing and planned resources  
17 suggests a shortfall of power in 2024. However, this position is predicated on the  
18 construction and commissioning of the Vermont Wind project located in Sheffield,  
19 Vermont. WEC has entered into a 4 MW contract with Vermont Wind for a wind project  
20 that is projected and planned to be constructed in Sheffield, Vermont by 2011. If the  
21 Vermont Wind project is not constructed, then by 2016 WEC's faces a 13% gap in its

1 power supply portfolio as compared to its base case load forecast. This gap is created  
2 directly by the expiration of the current HQ VJO contract and assuming the Vermont  
3 Wind project does not come on line.  
4

5 Q9. Please describe WEC's need relative to the Vermont Wind project in more detail.

6 A9. WEC has a number of concerns that if the Vermont Wind project is not constructed or the  
7 timing of the project is delayed substantially, it will be left short of power and be forced  
8 to make potentially higher priced market purchases. Given the uncertainty and timing of  
9 the Vermont Wind project, which is currently tied up in an appeal process for a storm  
10 water runoff permit, ultimate construction is uncertain at this time. As a result, WEC  
11 desires to enter into the WEC -VPPSA HQUS PPA Sub-allocation Agreement as a hedge  
12 against the wind project not coming on line or to meet load needs that are left unmet in  
13 the event of other supply disruptions. For example, if the wind project is constructed but  
14 the output is lower than projected, WEC could still be left short power beginning in 2016.  
15 WEC's current resource outlook with and without the First Wind project is graphically  
16 depicted in Exhibit WEC 2 (PR-2) and Exhibit WEC 3 (PR-3), respectively.  
17

18 Q10. Are there other resources in WEC's mix that the WEC -VPPSA HQUS PPA Sub-  
19 allocation Agreement can be used to serve as a hedge to cover WEC's need for power.

20 A10. Yes. WEC is heavily dependent on its landfill generating project (Coventry) which  
21 currently supplies approximately 70% of its total power supply needs. This concentration

1 risk is a concern for WEC and identification of methods to mitigate risk exposure is  
2 important in WEC's management of its power supply portfolio. Currently Coventry  
3 output is approximately 6 MW and is a base loaded generating unit operating nearly  
4 around the clock. This reliance on a single source has exposed WEC to supply  
5 interruptions and has created a heavy dependence on the landfill's gas recovery system at  
6 the Coventry site. As an example of the concentration risk, in August 2006, one of the  
7 engines caught fire and output from the facility ceased completely during the repairs for  
8 approximately four (4) months from August to November. WEC had to make an  
9 unexpected purchase of power to replace the Coventry project and the added costs for  
10 replacement power were significant.

11  
12 Q11. Please describe how WEC would use the WEC -VPPSA HQUS PPA Sub-allocation  
13 Agreement as a hedge in its portfolio.

14 A11. WEC plans to enter the WEC -VPPSA HQUS PPA Sub-allocation Agreement to take its  
15 share of allocation but it then plans to convey or "sleeve" its allotment to Vermont  
16 Electric Cooperative (VEC) until the time WEC needs the power. As part of the WEC-  
17 VEC Sleeve arrangement, WEC can elect to take power back from VEC in the event  
18 certain conditions occur that leave WEC short power relative to its load needs. The sleeve  
19 is structured such that WEC can elect to get all or a portion of the HQ allotment back  
20 from VEC. WEC can elect to get power back from VEC with 1 month notice in the event  
21 of an interruption of supply and then WEC can put it back when the supply interruption

1 ceases. The other call option in the agreement with VEC is that if WEC's loads rise  
2 relative to its resources it can give a one-year notice to permanently call back the power  
3 from VEC as needed for the remaining life of the WEC -VPPSA HQUS PPA Sub-  
4 allocation Agreement. This long-term call back option is tied to the amount of power  
5 WEC needs and can be phased in increased until the full allocation of power through the  
6 WEC -VPPSA HQUS PPA Sub-allocation Agreement is taken back by WEC.

7  
8 Q12. Please describe the Agreement between VEC and WEC in more detail and how WEC  
9 plans to use it.

10 A12. The sleeve has been negotiated with Vermont Electric Cooperative (VEC) and a copy is  
11 attached as Exhibit WEC 4 (PR-4). The beauty of this arrangement for WEC is that it  
12 provides two distinct flexible call options in its resource mix. The first option provides  
13 access within one month in the event of a supply interruption and allows WEC to put it  
14 back to VEC if and when WEC no longer needs the power. The second call option allows  
15 WEC the ability to call the contract back due to load growth or due to expiring resources  
16 for the remaining life of the WEC-VPPSA HQUS PPA Sub-allocation Agreement.

17  
18 Hence, WEC plans only to include the portion of power coming from the WEC -VPPSA  
19 HQUS PPA Sub-allocation Agreement in its own power supply mix to serve its load  
20 needs in the event of a need in the future. The sleeve allows the WEC -VPPSA HQUS  
21 PPA Sub-allocation Agreement to act as a callable hedge for the life of the contact

1 against items such as unplanned supply interruptions and load growth. The option  
2 structure (or sleeve) also allows WEC to continue its efforts to offset load through its  
3 energy efficiency programs and those of the statewide efficiency utility, Efficiency  
4 Vermont (EVT). Therefore, WEC's participation in the HQUS PPA does not preclude  
5 WEC from continuing cost effective demand side management efforts.  
6

7 Q13. Please describes WEC's current load and identify and describe the load assumptions used  
8 to develop Exhibit WEC 2 (PR-2) and Exhibit WEC 3 (PR-3).

9 A13. WEC's annual purchase power load as measured by real time load obligation (RTLO) in  
10 2009 was 76,862 MWH. WEC peaks in the winter and in 2009 its peak was 16.27 MW.  
11 In April 2010, La Capra Associates completed a long term load forecast for WEC that  
12 included a high, low and base case load forecast. The base case load forecast over an 18  
13 year period resulted in a compound annual growth rate (CAGR) of 1.3 %. The high case  
14 forecast resulted in a CAGR of 2.25% and the low case projected flatter load growth with  
15 a CAGR of only 0.5%. The load forecast is a blended one, based on a 3-year time series  
16 model for the first three years, together with econometric models used to forecast longer  
17 term growth which were developed for each of the major classes and for peak  
18 requirements.  
19

20 Q14. How does the WEC -VPPSA HQUS PPA Sub-allocation Agreement fit with WEC's  
21 hourly profile of load?

1 A14. The WEC -VPPSA HQUS PPA Sub-allocation Agreement contract structure is a good fit  
2 with WEC's load shape. The contract is delivered 7 days a week for 16 hours from HE  
3 08:00 to HE 23:00. WEC's load shape is primarily driven by a residential customer  
4 pattern in which loads rise in the morning between 7 and 8 a.m., decline slightly to the  
5 midday hours, and then rise even higher in the evening hours between 5 and 10 p.m. See  
6 Exhibit WEC 5 (PR-5), WEC's aggregate hourly load averaged by hour over an annual  
7 period. This shape is consistent for both weekdays and weekends. Therefore, the WEC  
8 -VPPSA HQUS PPA Sub-allocation Agreement structure of 7x16 delivery provides a  
9 good fit compared to WEC's load shape and need for power when looked at in an hourly  
10 pattern.

11  
12 Q15. Please identify and describe the demand savings assumed in your load projections.

13 A15. La Capra's load forecast assumes no new energy efficiency measures are implemented in  
14 the forecast. However, the rate of past load reduction through WEC's efficiency  
15 programs and EVT's is built into the historical actual load numbers which drive the  
16 forecast. Since the underlying historical data and actual loads are used in La Capra's load  
17 forecasts, a baseline of continued energy efficiency is assumed to occur in the load  
18 forecast. Assuming WEC and EVT's DSM programs continue at the existing rate, as yet  
19 uncommitted efficiency efforts have not been factored into the load forecast assumptions.

20

21



1 Q16. Do the projected demand reductions offset WEC's need for a flexible hedge contract that  
2 is created through entering the WEC -VPPSA HQUS PPA Sub-allocation Agreement and  
3 WEC-VEC Sleeve agreement?

4 A16. No. As stated earlier WEC will only elect to take a portion of the power from the WEC -  
5 VPPSA HQUS PPA Sub-allocation Agreement using the sleeve arrangement with VEC  
6 in the event of a future need occurring such as a supply interruption or increased load.  
7 Therefore, energy efficiency efforts will only work to help avoid the need for WEC to  
8 exercise an option to take power under the WEC -VPPSA HQUS PPA Sub-allocation  
9 Agreement.

10  
11 **4. Section 248(b)(4) – Economic Benefit**

12 Q17. Section 248(b)(4) requires the Board to find that the HQUS PPA and sleeve will result in  
13 an economic benefit to the state and its residents. Do the agreements result in an  
14 economic benefit and please explain how this criterion is satisfied.

15 A17. Yes, the combination of the WEC-VPPSA HQUS PPA Sub-allocation Agreement and  
16 sleeve agreement with VEC result in attributes that make the combination a valuable  
17 addition to WEC's longer term power supply portfolio and provide an economic benefit  
18 to WEC's members. This combination of contract features of the WEC-VPPSA HQUS  
19 PPA Sub-allocation Agreement and sleeve option with VEC will increase the price  
20 stability of WEC's supply portfolio, reduce ratepayer exposure to market-price volatility  
21 driven by fossil-fuel price volatility or other events, and will provide a flexible option in

1 the event of unanticipated supply interruptions or load growth. The WEC-VPPSA  
2 HQUS PPA Sub-allocation Agreement and sleeve will provide WEC the option to strike  
3 when it ultimately needs a long-term, renewable power source that is stably priced, and at  
4 prices that are projected to be favorable compared to other alternatives. The contract also  
5 acts as a hedge to protect WEC's rate payers from energy price spikes such as that could  
6 result from the impacts of future carbon legislation which would cause energy prices to  
7 rise due to regulatory requirements. All of these elements support the fact that the  
8 contract and sleeve is an economic benefit to WEC members.

9  
10 Q18. Please explain how the section 248(b)(4) economic benefit criterion was examined for  
11 this contract.

12 A18. In order to evaluate the economics of the WEC-VPPSA HQUS PPA Sub-allocation  
13 Agreement, La Capra Associates ran a number of simulations of market price cases using  
14 nominal values with varying inflation rates to test how the HQUS PPA contract price  
15 (and thereby the rates charged in the WEC -VPPSA HQUS PPA Sub-allocation  
16 Agreement) would change and react to various combinations of market energy prices and  
17 inflation rates. Since the HQUS PPA contract price will reflect the combined impact of  
18 inflation and market energy prices, a number of scenarios for each variable were  
19 analyzed. The resulting HQUS PPA contract prices were compared to projections for  
20 market energy prices to determine the extent to which the contract appeared economic.  
21 The inflation rates reflected high and low case projections developed using high and low

1 values over the last 27 years and the base being the average for the period. See Exhibit  
2 WEC 8 (PR-8), inflation data from the Bureau of Economic Analysis.

3  
4 Q19. Please describe the conclusions of your analysis.

5 A19. The conclusion of our analysis found that the HQUS PPA prices will be less expensive  
6 than market alternatives in most of the cases analyzed. We found the HQUS contract  
7 prices to be less volatile than market energy prices, and, by the structure of the annual  
8 pricing formula, the HQUS contract effectuates a long term smoother price trajectory.  
9 Therefore, market price spikes displayed since the advent of SMD (2003) are dampened  
10 by the mechanics of the price formula. As a result, the contract provides price stability  
11 and thereby reduces WEC members' exposure to market-price volatility driven by fossil-  
12 fuel price volatility and other factors such as changes in market heat rates, in the event  
13 WEC elected to take the contract into its portfolio. The details of how we reached this  
14 conclusion will follow below.

15  
16 Q20. Please describe the tools and underlying structure used to develop a projection of energy  
17 market prices used in the analysis of the HQ contract?

18 A20. La Capra Associates used its Northeast Market Model which is developed on the Aurora  
19 production simulation platform. The model provides a representation of the electrical  
20 system of New England and the neighboring regions. The Northeast Market Model is a  
21 zonal model where the electrical system is represented by a series of zones. For New

1 England, the zones represented in the model correspond to the zones defined in ISO New  
2 England's Regional System Plan in which the state of Vermont is a single zone. The  
3 zones are connected together in the same structure as is also specified in the Regional  
4 System Plan. The connections between zones are represented by the transmission  
5 system. The connections between modeled zones do not represent any particular  
6 transmission asset, rather they represent the aggregate transfer capability of the regional  
7 transmission systems. The transfer capability between zones is based on information  
8 provided in the Regional System Plan on current transfer capability as well as proposed  
9 additions and upgrades to the regional transmission system.

10  
11 Q21. Please provide an overview of the source of demand and resource assumptions used in La  
12 Capra Associates Northeast Market Model and how market prices are generated.

13 A21. Each zone contains assumptions of the demand for power for the zone and the  
14 corresponding generating resources located in that zone. The ISO-NE 2009 Capacity,  
15 Energy, Load, and Transmission ("CELT") Report published by ISO New England  
16 provides the basis for the forecast of demand by zone. The CELT Report also lists the  
17 resources located in each zone as well as the size and type of each resource. The  
18 resources represented in the model are verified against the CELT Report to ensure the  
19 model is representing the resources in a manner that is consistent with the physical  
20 system.

21

La Capra Associates' model utilizes the Aurora market simulation software to forecast market prices for electric energy in which market prices are calculated by simulating the operation of the electric system and the energy market. In addition to the demand, supply, and transmission assumptions described above, the model also utilizes a number of other assumptions including fuel prices, generating unit characteristics and emission costs including the price of carbon. Using these assumptions simulates the operation of the resources such that the demand in all zones is met in the least cost manner across all zones. Market prices for each zone are calculated based on the relative demand and supply of the zone.

Q22. Please describe the major assumptions used in the model to develop a projection of market prices for the analysis of the HQ contract.

A22. La Capra assumed a number of inputs in modeling market prices to generate high, base and low case market price forecasts of the New England zones including the Vermont Zone and the Hub. The most significant modeling inputs in terms of affect on market prices were the treatment of carbon and natural gas prices. The table below summarizes the modeling inputs for carbon and natural gas that were used.

Market Price Case	Carbon	Natural Gas
Low	RGGI Only	EIA High Shale Resources
High	EIA Waxman-Markey High Case	EIA No New Low Permeability Drilling Shale beyond 2009
Base	EIA Waxman-Markey Base Case	EIA Reference

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Q23. Please describe the market price cases generated from this analysis.

A23. In the high and base case, carbon dioxide emission allowance prices are based on an analysis by the Energy Information Administration (EIA) of legislation proposed in Congress to regulate the emissions of carbon dioxide (specifically the Waxman-Markey bill). The low case assumed that only the existing RGGI program affected the price of carbon. All cases used natural gas estimates based on EIA’s 2010 Annual Energy Outlook.

The low market price case reflects a combination of carbon and natural gas that result in low prices for each assumption. More specifically we assumed RGGI only legislation to be in place for carbon impacts which puts a low value on the price of carbon. See Exhibit WEC 6 (PR-6), which represents carbon pricing assumptions from the EIA data and the current price of carbon through RGGI. In the low case, carbon starts at \$2.50/ton and stays constant nominally through the planning period. For the price of natural gas we used an EIA forecast which generates low natural gas prices as a result of a high natural gas supply scenario. For this we used EIA’s high shale case reflecting increased domestic supply from Marcellus, Barnett and other domestic shale formations. See Exhibit WEC 7 (PR-7), a copy of natural gas curves based on EIA data. In this case gas starts at \$6.40/mmbtu in 2012 and rises to \$7.52/mmbtu by 2030 with all dollars stated in nominal terms.

1 In the high market forecast case, La Capra used a combination of carbon and natural gas  
2 scenarios that result in high prices for both variables. The high price carbon case is based  
3 on the EIA's evaluation of the Waxman-Markey bill using high carbon cost assumptions.  
4 In the high price case, carbon begins nominally at \$22.60/ton and rises to \$76.08/ton by  
5 2030. For natural gas, EIA's forecast of low supplies of natural gas was used which  
6 corresponds to assumptions of no new low permeability drilling in shale reserves beyond  
7 2009. The result of this scenario is high natural gas prices as a result of a low natural gas  
8 supply scenario. In this case, natural gas starts nominally at \$6.72/mmbtu in 2012 and  
9 rises to \$11.30/mmbtu by 2030.

10  
11 In the base market forecast case, La Capra used a combination of base case assumptions  
12 for carbon and natural gas. For carbon, EIA's evaluation of the Waxman-Markey bill  
13 with base case cost assumptions was used. In this case carbon begins nominally at  
14 \$18.13/ton and rises to \$61.02/ton. For natural gas, EIA's base case, known as the  
15 reference case, was used. More specifically, natural gas starts nominally at \$6.41/ mmbtu  
16 in 2012 and rises to \$8.89/mmbtu by 2030. Please see Exhibit WEC 6 (PR-6), carbon  
17 pricing assumptions, and Exhibit WEC 7 (PR-7), EIA natural gas curves, for details on  
18 all the cases.

19  
20 Other assumptions used in the analysis include demand, fuel prices, and assumptions  
21 relative to the mix of generation resources available in the region. For this analysis, New

1 England zonal demand is based on the 2009 CELT Report. Long term fuel prices are  
2 based on the Energy Information Agency's 2010 Annual Energy Outlook. Resource  
3 additions and retirements are based on the results of the first three Forward Capacity  
4 Auctions as well as assumptions of generic renewable capacity being added sufficient to  
5 meet the RPS requirements of the various states in the region. For this analysis, WEC  
6 assumed the Vermont Yankee plant does not renew its license in 2012, and therefore, the  
7 plant is considered offline beyond 2012.

8  
9 Q24. Please further describe the economic analysis used to evaluate the HQ Contract.

10 A24. La Capra Associates modeled the HQUS PPA contract terms and the market projections  
11 derived from the assumptions described above to identify dollar costs of the contract  
12 versus market. All dollar streams were then summarized using a present value calculation  
13 over the life of the contract. We then compare each case to comparable market  
14 projections with varying rates of inflation to determine if the contract is above or below  
15 market using varying inflation rates. In all cases the forecast for market prices was from  
16 La Capra Associates' Northeast Market model and then the market price was adjusted to  
17 be consistent with the energy profile and delivery point referenced in the HQ USPPA.  
18 The conclusion of our analysis found that the HQUS PPA prices will be below market  
19 over the life of the contract in a majority of the cases. A summary of the cases and  
20 results is shown in Exhibit WEC 9 (PR-9).



1 Q25. What can you conclude from your analysis as it relates to the economic benefit from the  
2 HQUS PPA contract?

3 A25. The economic analysis demonstrates that under the most likely energy price and  
4 inflation scenarios that the contract would have a positive net present value to WEC if  
5 called upon to meet WECs needs. As demonstrated in Exhibit WEC 9 (PR-9), in  
6 **\*\*\*begin confidential information\*\*\*** **\*\*\*end confidential**  
7 **information\*\*\*** cases simulated, the HQ contract was **\*\*\*begin confidential**  
8 **information\*\*\*** **\*\*\*end confidential information\*\*\*** over its cumulative  
9 lifetime. Of the remaining **\*\*\*begin confidential information\*\*\*** **\*\*\*end**  
10 **confidential information\*\*\*** cases the HQUS PPA contract was **\*\*\*begin confidential**  
11 **information\*\*\*** **\*\*\*end confidential information\*\*\*** over its lifetime.  
12 However, **\*\*\*begin confidential information\*\*\*** **\*\*\*end**  
13 **confidential information\*\*\*** cases was deemed highly improbable (low energy prices  
14 and high inflation) and the other **\*\*\*begin confidential information\*\*\*** **\*\*\*end**  
15 **confidential information\*\*\*** cases can be considered moderately improbable (base  
16 energy prices with high inflation and low energy prices and base rate of inflation). Of  
17 course, while some years the contract could be above market as shown with volatile  
18 energy prices and the cases with low energy market prices, over the long term the  
19 contract in most cases would provide an economic benefit to WEC's members based on  
20 the assumptions of market prices generated in the analysis.

1       **\*\*\*begin confidential information\*\*\*** [REDACTED]

2       [REDACTED]

3       [REDACTED]

4       [REDACTED]

5       [REDACTED]

6       [REDACTED]

7       [REDACTED]

8       [REDACTED]

9       [REDACTED] **\*\*\* end confidential information\*\*\***

10  
11   Q26.   You have discussed a fairly robust scenario analysis used to examine the economic  
12           benefit of the HQUS PPA. Did you examine any “breakeven” scenarios?

13   A26.   Yes. La Capra Associates also developed a market price projection, presented in Exhibit  
14           WEC 11 (PR-11), in which the contract present value broke even assuming a base case  
15           rate of annual inflation of **\*\*\*begin confidential information\*\*\*** [REDACTED] **\*\*\*end**  
16           **confidential information\*\*\***. In this analysis the annual growth rate of market prices  
17           would need to be **\*\*\*begin confidential information\*\*\*** [REDACTED] **\*\*\*end confidential**  
18           **information\*\*\*** per year for the contract price to break even relative to market prices.  
19           Put another way, if annual market energy prices increase at a rate greater than **\*\*\*begin**  
20           **confidential information\*\*\*** [REDACTED] **\*\*\*end confidential information\*\*\*** over 22  
21           years then the HQUS PPA contract would provide an economic benefit to WEC members

1 as it would be less expensive than purchasing energy from the market.

2  
3 Q27. What are the major conclusions that can be drawn from your analysis and your  
4 testimony?

5 A27. The WEC-VPPSA HQUS PPA Sub-allocation Agreement combined with the sleeve  
6 agreement with VEC is expected to provide an economic benefit to WEC and its  
7 members. This combination of agreements provides WEC as-needed access to a new,  
8 long-term power resource, increases resource diversity, hedges against price impacts due  
9 to carbon legislation, and incorporates new options to the WEC supply mix to mitigate  
10 supply interruptions. WEC's ability to combine the sleeve arrangement in tandem with  
11 entering the WEC-VPPSA HQUS PPA Sub-allocation Agreement gives WEC the ability  
12 to use the contract as a hedge in its power portfolio that can be tapped in the event of  
13 unanticipated supply interruptions or due to increasing load. This will provide WEC  
14 members energy at prices that are relatively stable over time and the price of the contract  
15 is likely to be below market in the most likely scenarios of future market prices. As a  
16 long-term, stably priced resource with prices indexed to market, the WEC-VPPSA  
17 HQUS PPA Sub-allocation Agreement represents a favorable addition to WEC's power  
18 supply portfolio that provides resource diversity and protection in the event a need arises,  
19 owing to the call and put option features of the sleeve.

1           **5.     Section 248(b)(6) – IRP**

2   Q28.   Please explain how the HQUS PPA complies with WEC's approved IRP.

3   A28.   WEC filed an IRP in 2003 for the power planning period covering 2004 through 2023  
4           which was approved by the PSB. The focus of the 2003 IRP was on securing sufficient  
5           resources to replace a gap in WEC's power portfolio that was mainly driven by the  
6           termination of the Vermont Yankee power contract. WEC was in need of base loaded  
7           sources of power to serve a large portion of its power supply needs.

8  
9           In WEC's 2003 IRP WEC states:

10                 “WEC has determined that it should pursue several key objectives: minimize  
11                 power supply-related revenue requirements, reduce power supply risks and cost  
12                 variance, promote long-term financial stability and increase its percentage of  
13                 Vermont-based renewable power supply.”<sup>1</sup>

14           These goals and the underlying analysis of the 2003 IRP supported the development of  
15           the Coventry landfill generating project in which 6 MW's are currently operating as a  
16           base load resource.

17  
18           WEC filed an IRP in 2007 and a stipulated proposal for decision has been pending since  
19           August 2009. While the 2007 IRP has not been approved the fundamental principles of  
20           the 2003 which was approved remain the same in the 2007 filing. In WEC's 2007 IRP

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1 . Washington Electric Cooperative, Inc., 2003 Integrated Resource Plan 2004 – 2023. See attached Exhibit WEC 10 (PR-10), excerpts of WEC's IRPs.

1 filings it identified 3 fundamental goals:

- 2 i Minimize power supply-related revenue requirements,
- 3 i Reduce power supply risks and cost variance, and
- 4 i Promote long-term financial stability.<sup>2</sup>

5  
6 WEC's power purchase under the WEC-VPPSA HQUS PPA Sub-allocation Agreement  
7 is consistent with its objectives and action plans of its 2003 and 2007 least-cost integrated  
8 plan. WEC's review of the HQUS PPA contract structure paired with the structure of  
9 the sleeve to VEC will allow WEC to minimize power supply related revenue  
10 requirements, reduce power supply risk and cost variance, and as a consequence promote  
11 long-term financial stability.

12  
13 The 2007 WEC IRP identified a concentration risk associated with one source of power,  
14 the Coventry landfill gas generating plant. In fact Coventry supplies almost 70% of  
15 WEC's current load needs. The WEC-VPPSA HQUS PPA Sub-allocation Agreement  
16 helps to address this risk. In the event Coventry or any other long term WEC power  
17 source is interrupted, WEC can elect to take the HQ power in its own mix with one  
18 month's notice to VEC. In the event of the supply interruption ends and WEC no longer  
19 needs the power it can put the power back to VEC. This will allow WEC to minimize  
20 power supply related revenue requirements as WEC has an immediate option to secure a

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2 . *Id.*

1 source of power at a stable and known price, rather than be subject to potentially  
2 unfavorable spot market purchases or other purchase options.  
3

4 Q29. Can WEC's power supply risk and cost variance also be managed in the same way?

5 A29. Yes. Power supply risk and cost variance can also be managed in the same way. In  
6 addition to using the short term call back feature of the sleeve which is described above,  
7 the long term call back insulates WEC over the long term from being forced to purchase  
8 from a potentially unfavorable market in the event loads grow. In fact, WEC's load  
9 forecast projects by 2024, which is only 8 years into a 22 year contract, that it will need  
10 power due to growth in load. In addition, if the Vermont Wind project is not constructed  
11 WEC will have a need for power as early as 2016 when the current HQ VJO contract  
12 expires. Thus, there is a contingency value to the WEC-VPPSA HQUS PPA Sub-  
13 allocation Agreement combined with the WEC-VEC Sleeve agreement as the HQUS  
14 contract acts as a hedge or back-up source to the energy coming from the existing  
15 generating projects like Coventry and Vermont Wind, or if WEC experiences growth in  
16 load. This contingency value reduces power supply risk and cost variance in WEC's mix.  
17

18 Q30. Does the WEC -VPPSA HQUS PPA Sub-allocation Agreement promote long term  
19 financial stability?

20 A30. Yes. The HQUS PPA also promotes long-term financial stability. The contract will be  
21 available to WEC from 2016 to 2038 or for 22 years. Conventional power marketers and

1 current bilateral markets do not offer contracts of this duration. For this reason and as  
2 discussed previously, this long term contract availability in turn offers long-term financial  
3 stability to WEC and its members.  
4

5 Q31. Does the WEC -VPPSA HQUS PPA Sub-allocation Agreement also provide WEC with  
6 other financial benefits?

7 A31. Yes an additional benefit of the WEC-VPPSA HQUS PPA Sub-allocation Agreement is  
8 the credit support provision. The underlying credit support provision in the HQUS PPA  
9 is described in the testimony of Cole/Deehan. This provision has an ancillary benefit to  
10 the structure of the contract. As a result, the potential for burdensome credit  
11 requirements is reduced. Additionally, WEC's portion of credit risks is managed through  
12 the WEC-VPPSA HQUS PPA Sub-allocation Agreement with all the signatories to that  
13 agreement using VPPSA's credit rating of A3as measured by Moody's Investors Service.  
14 This is a benefit to WEC as it currently does not have a credit rating.  
15

16 Q32. How does WEC -VPPSA HQUS PPA Sub-allocation Agreement promote long-term  
17 financial stability from a renewable power sources?

18 A32. The source of power is also important to WEC as the WEC-VPPSA HQUS PPA Sub-  
19 allocation Agreement will provide a source of power with renewable attributes included  
20 that will be hydro based. The underlying agreement between the Vermont Distribution  
21 utilities and HQUS includes a provision that HQUS will transfer environmental attributes

1 associated with the energy provided in the contract.

2  
3 As part of the WEC-VPPSA HQUS PPA Sub-allocation Agreement, renewable attributes  
4 will be transferred to WEC with its allocation of power. Notably, revenues from the sale  
5 of REC's are possible but WEC has not factored those into the economic analysis of the  
6 transaction due to the significant uncertainty of the value of renewable energy certificates  
7 in the future from a large hydroelectric resource. Currently HQ's hydro resources do not  
8 qualify in meeting the renewable portfolio standards of other New England states due to  
9 size limitations imposed on hydro. Therefore, REC revenues do not exist currently for  
10 hydro from HQ.

11  
12 Q33. Please summarize your conclusions as to how the WEC -VPPSA HQUS PPA Sub-  
13 allocation Agreement complies with WEC's IRP.

14 A33. For all the reasons stated above participating in the WEC-VPPSA HQUS PPA Sub-  
15 allocation Agreement and WEC-VEC Sleeve will allow WEC to mitigate risk, minimize  
16 exposure to market price volatility in the event of a supply disruption, and offer revenue  
17 stability to WEC's members from a renewable resource in the event of a supply  
18 interruption or increase in load growth.

19  
20 Q34. Do Vermont consumers generally support a long term contract and power coming from  
21 Hydro Quebec?



1 A34. Yes. The contract is consistent with the finding of the DPS Public Engagement process  
2 that was held in 2007. In this public opinion polling process 3 forms of public input were  
3 sought. In all of the 3 forms used, Vermont consumers reported high support for a new  
4 Hydro Quebec contract structure.<sup>3</sup> At regional workshops 80% of the participants  
5 believed that Vermont should continue to purchase from Hydro Quebec. The fact that this  
6 primary source of power was hydro based contributed to the desirability of a new  
7 contract. In the Deliberative Polling exercise 86% of participants believed that Vermont  
8 should continue buying power from Hydro Quebec. The third format, which was web  
9 based conferences coordinated by the DPS, found that 94% of participants felt the state  
10 should continue getting power from Hydro Quebec. This data suggests consumers across  
11 Vermont are very supportive of Hydro Quebec power and WEC believes the HQUS PPA  
12 is consistent with its members desires expressed in that outreach effort.

13  
14 Therefore, the HQUS PPA was also selected by WEC in furtherance of Vermont energy  
15 policy as expressed in 30 V.S.A. §§ 202a, 218c, 8001(a), 8005, and the 2005 Vermont  
16 Electric Plan, and the preferences expressed by customers as defined through the state-  
17 managed public engagement process named “Vermont’s Energy Future.”

18  
19 **6. Section 108.**

20 Q35. Is WEC, also, seeking approval under 30 V.S.A. § 108?

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<sup>3</sup> Vermont Department of Public Service, Public Engagement Process Executive Summary, January 2008

1 A.35. Yes. WEC requests that the Public Service Board consent, pursuant to 30 V.S.A. § 108,  
2 to the pledge of collateral under its respective sub-allocation agreement with VPPSA , as  
3 it may be required to post over the term of the agreement. The collateral requirement  
4 under the sub-allocation agreement with VPPSA may be triggered in the event VPPSA  
5 must satisfy collateral obligations under the HQUS-PPA. WEC's collateral obligation is  
6 an essential term, and its approval along with the underlying sub-allocation agreement is  
7 consistent with the general good of the State.

8  
9 Q36. Does this complete your testimony?

10 A36. Yes at this time.

11 3831768.1